Quarterly Report 8 – Public Page

Date of Report:	July 8, 2010
Contract Number:	DTPH56-08-T-000008
Prepared for:	DOT
Project Title:	Achieving Maximum Crack Remediation Effect from Optimized Hydrotesting

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(For quarterly period ending: June 30, 2010)

Background

Hydrotesting is one of the key techniques widely adopted for pipeline integrity management. A dilemma is created when hydrotesting is performed on pipelines experiencing stress corrosion cracking: hydrotesting eliminates defects of critical size and conditions sub-critical cracks to achieve a post-test period without operating failure; adversely it shortens remaining life because of crack growth during hydrotesting even for small SCC cracks according to the latest research findings. This project is aimed to determine how effective hydrotesting is toward crack remediation. Specifically, efforts will be made to establish a working model that will allow the industry to predict the overall benefits of hydrotesting. When hydrotesting is necessary, the model will help pipeline operators select the hydrotesting parameters that would generate the most effective crack remediation.

Progress in the Quarter

Project activities undertaken through the 8th quarter focused on studying various hydrostatic loading parameters and establishing optimized loading procedures.

In the previous reporting period, efforts were made in determining crack growth retardation and acceleration as affected by change of loading conditions. In the current reporting period, we have analyzed some of tests completed in the previous period using specimens containing three surface cracks that are located at different position to the open mouth of disbonded holiday. The open mouth cathodic potential was maintained at -1.2 volt and -0.9 volt, respectively. Two repeated tests were conducted at each cathodic potential. The fastest growth at -1.2 volt was found in the crack located at the open mouth because of the hydrogen effects. However, to our surprise, the fastest growth, almost an order magnitude higher, was found to be associated with the crack located at the middle of disbonded holiday when cathodic potential at the open mouth was at -0.9 volt. This observation is important in terms of the effect of cathodic potential on crack growth during hydrostatic loading. In this period, we have also continued several hydrostatic simulations using compact tension specimens. These tests were performed to

determine optimized loading procedures that would generate the most effective crack remediation. Based on the results and various models established, safe windows for hydrostatic tests can be selected.

Plans for Future Activity

- To continue working on external conditions affecting crack growth during hydrotesting and establishing safe testing windows with minimum damage to pipelines due to hydrotesting.